

Mahavir Mahavidyalaya, Kolhapur

Department of Electronics

Teaching Plan 2024-25

B.Sc- I

Course Teacher: Prof. Mayuri S. Deshpande

Course Title: Electronics Circuit Elements (Sem I)(Paper I)

Month	Theory	Practical
July	Admission process Unit I A) Semiconductors Diode: Semiconductors, intrinsic semiconductor, extrinsic semiconductor, majority and minority charge carriers Construction of PN junction diode, formation of depletion layer, barrier voltage, V-I characteristics of PN junction diode Types of diodes, Symbols, Forward & reverse biasing of a diode, Zener diode, Schottky diode, LED diode,, Applications of diodes,	1) Study of various Electronic components, equipment & measuring devices. 2) Measurement of Amplitude, Frequency & Phase of waveforms by using CRO.
August	B) Bipolar Junction Transistor: Types of Transistors, Symbols, Construction details & working of NPN & PNP transistors, Operating modes of transistor, Transistor configurations: CB, CC, CE, Comparison between CB, CC & CE, Applications: Transistor as an Amplifier, Transistor as an Electronic Switch	3) Analyze the operation of Transistor working as Electronic switch (Use LED & Relay in the circuit)
September	UNIT II A) BJT Amplifiers & Oscillators: Classification of Amplifiers(based on frequency	4) Demonstrate Op-Amp Adder by using IC741

	range, Q point, coupling & stages), Single stage amplifier & Need of Multistage amplifier, Coupling Scheme: Direct, RC, LC coupling in detail)(only circuits using transistors & frequency response), class-A, class-B, class-C & class-AB amplifiers, Concept of positive and negative feedback (only equations, no mathematical analysis). Oscillators: RC-phase shift, LC type: Colpitt's oscillator, Hartley's oscillator, Crystal oscillator (Circuits & its working, no mathematical analysis, formula only), Applications of Amplifiers and Oscillators CE, Applications: Transistor as an Amplifier, Transistor as an Electronic Switch. .	
October	B) Operational Amplifier: Concept of Differential amplifier, Definition of Operational Amplifier, Internal block diagram of Op-Amp IC-741, Symbol & Pin diagram of IC-741, Ideal & Practical characteristics/parameters of Op-Amp IC-741, Configurations of Op-Amp: Open-Loop & Closed Loop,	5) Demonstrate Op-Amp Subtractor by using IC-741. 6) Demonstrate Monostable multivibrator by using Timer IC-555.
November	Linear & Nonlinear applications of Op-Amp: Inverting mode amplifier, Virtual ground, Sign changer (Inverter), Non-inverting amplifier, Unity gain amplifier, Op-Amp Adder, Op-Amp Subtractor, Op-Amp Comparators, Schmitt trigger, IC-555: Pin diagram & internal block diagram of IC-555, Concept & Types of multivibrators. Oct	7) Demonstrate Astable multivibrator by using Timer IC-555.

Course Teacher: Prof. P.A. Kshirsagar

Course Title: Digital Systems – I (Sem I)(PAPER II)

Month	Theory	Practical
July	Admission process	
August	UNIT I A)Number System & Computer Codes Introduction and definition, Classification (Positional & Non – Positional), Positional Number System – Binary Number System, Decimal Number System, Octal Number System, Hexadecimal Number System, Conversion from one base to another base, Binary Arithmetic, 1's & 2's complement of binary numbers.	1) Implementation of Logic gates.
September	B)Computer Codes: Introduction and definition, BCD: (4-bit BCD, 6-bit BCD), ASCII: (ASCII – 7, ASCII-8), Gray Code, Unicode. UNIT II Logic Gates Definition, AND, OR, NOT, NOR, NAND, EX-OR (Symbol, Expression and Truth Table), Boolean algebra and identities, De Morgan's theorem and Inter conversion of logic Gates (NAND and NOR),	2) Implementation of Universal building block (NAND & NOR.) 3) Implementation of De-Morgan's Theorems 4) Demonstrate the Half Adder
October	Introduction to K – map p (using SOP format up to 4 variables) with examples. CombinationalCircuits: Introduction,Half adder,Full adder,Half& Full Subtractor, Encoder (decimal to BCD), Decoder (BCD-Decimal), Multiplexer and De-multiplexer	5) Demonstrate the Full Adder 6) Implementation of Half Subtractor 7) Implementation of Full Subtractor 8) Implementation of Multiplexer 4:1 and 8:1 using IC

November	Exam Related Work	
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Course Teacher: Prof. P.A. Kshirsagar

Course Title: : Sensors & Signal Conditioning (Sem II)

Month	Theory	Practical
DeCember	Admission process UNIT I A)Sensors& Transducers: Definition of Transducers & Sensors, Classification of transducers& Sensors, Characteristics of Transducers, Specifications of Transducers (Accuracy, Range,Linearity, Sensitivity, Resolution, Reproducibility), Temperature: Thermocouple, RTD, LM35, Thermister, Pressure/ Force: Strain- Gauge, Piezo-Electric, LVDT, Photovoltaic Cell,	1) Execute the program of Study DAC (R-2R Ladder) using 8085 microprocessor.
January	B)Signal Conditioning& Data Convertors: Introduction, Signal conditioning of passive sensors using Wheatstone's bridge, Pre-Amplifiers, Filters: Concept, Active filters, Passive Filters (LowPass, HighPass,Band-Pass and Band-Reject filter- only frequency response), Digital Signal conditioning: Types of ADC: SAR-ADC, Flash-ADC, Specifications of ADC (Linearity, Resolution, Conversion time, Accuracy),Types of DAC: Binary, weighted resistors, R-2R Ladder DAC Analog Signal Conditioning: Instrumentation Amplifier using three Op-Amp,Differentiators, Integrators, Zero-crossing Detectors, Window Detectors.	2) Execute the program of Study Instrumentation amplifier using Op. Amp using 8085 microprocessor.
February	UNIT II A) Actuators & Data Acquisition Systems: Definition of Actuators, Types of Actuators, Electrical Actuators: Relays, Motors:	3) Execute the program of Study ON/OFF Temperature controller (LM34/LM35/AD590), using 8085

	AC, DC, Servo, Stepper, Data Acquisition Systems: Generalized DAS system, Signal conditioning for DAS, Types of DAS systems, Multiplexing, Sample and Hold Circuit .	microprocessor.
March	B) Digital Instruments & Display devices: Digital Multimeter, Digital Frequency Meter, Digital Universal Counter,Digital Tachometer. Concept of Digital Storage Oscilloscope, Digital Displays:LCD, LED.	
April	Practical Exam Related Work April Theory Exam Related Work	

Course Teacher: Prof. P.A. Kshirsagar

Course Title: : Digital Systems - II(Sem II)

Month	Theory	Practical
December	Unit I Sequential Circuits A) Concept of sequential circuits : Types of Flip-flops: RS, Clocked RS, Latch, D (edge triggered), JK, Master-Slave JK.	1)Execute the program of 1's Complement of 8 bit number using 8085 microprocessor. 2) Execute the program of 1's Complement of 16 bit number using 8085 microprocessor. 3) Execute the program of 2's Complement of 8 bit number using 8085 Microprocessor
January	B) Counter – Types of counters: :concept of synchronous counters,, asynchronous counters, 4-bit Ripple counter, Up-Down counter (3-bit), Construction of mod-5, mod-10 counter, Shift Register: SISO,SIPO,PISO,PIPO, Ringcounter..	. 4) Execute the program 2's Complement of 16 bit number using 8085 microprocessor. 5) Execute the program of Addition of two 8 bit data using 8085 microprocessor

		6) Execute the program Addition of two 16 bit data using 8085 microprocessor using 8085 microprocessor
February	UNIT II A) Memory Organization Introduction, Characteristics of memory systems, Vertical & horizontal Memory expansion (increasing the capacity, increasing word size), Memory hierarchy, Cachememory, Memory mapping techniques, Virtual Memory, Memory management concepts (paging and Segmentation), Introduction to USB storage device.	7) Execute the program of Subtraction of two 8 bit data using 8085 microprocessor. 8) Execute the program of Subtraction of two 16 bit data using 8085 microprocessor. 9) Execute the program of Decimal Addition of two 8 bit numbers using 8085 microprocessor
March	B) Introduction to Microprocessors General block diagram, Introduction & evolution of Microprocessors (4, 8, 16, 32..... Bits), Features, Pin Diagram and Architecture of 8085, Instruction Set of 8085 & Programming - Instruction format, addressing modes, ALP 's for Data transfer, Addition, Subtraction, Multiplication, Division, Block Transfer & Exchange Operations.	10) Execute the program of Decimal Subtraction of two 8 bit numbers using 8085 microprocessor. 11) Execute the program of 8 bit Division using 8085 microprocessor 12) Execute the program of 8 bit Multiplication using 8085 microprocessor
April	Practical Exam Related Work April Theory Exam Related Work	.